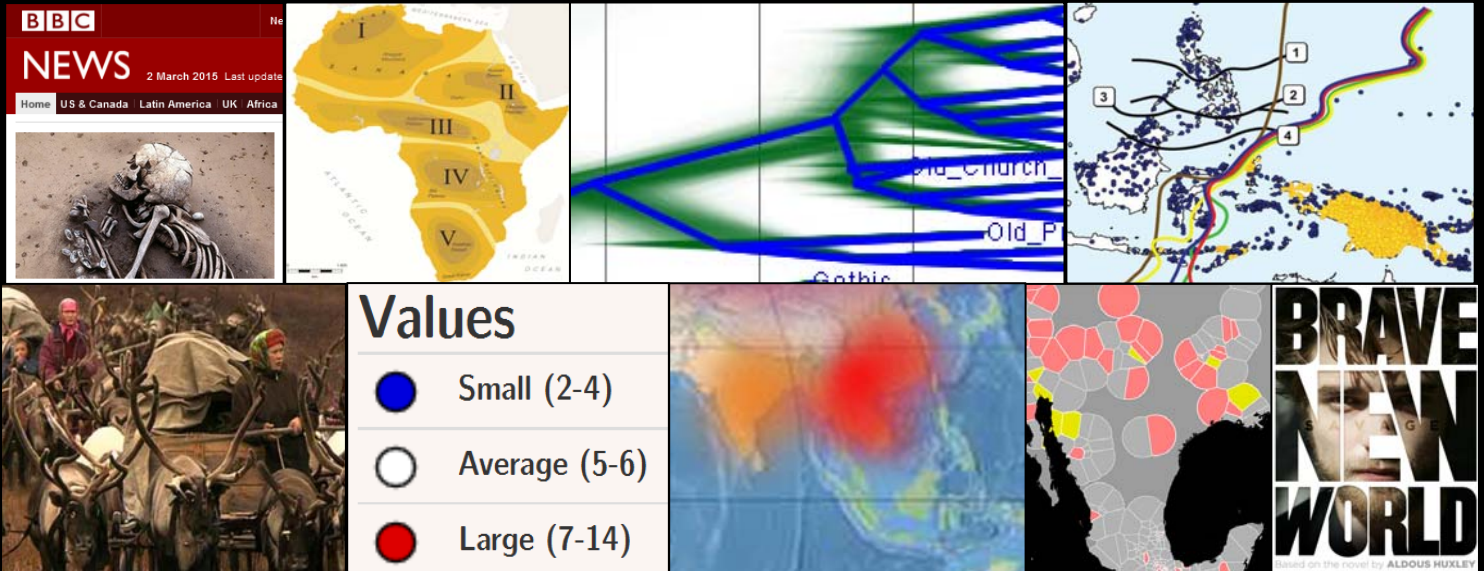


# COMPARATIVE AND 'DIVERSITY LINGUISTICS'

## WHERE NEXT?



Paul Heggarty

Linguistics, Max Planck Institute for Evolutionary Anthropology, Leipzig

Paul.Heggarty@gmail.com — <http://eva-mpg.academia.edu/PaulHeggarty>

# A WIND OF CHANGE?



# SIGN OF THE TIMES?

Dept of Linguistics

Bernard Comrie, (typological) linguist



... interested in “language universals” ... and “language typology”. Why are language universals and cross-linguistic variation the way they are? Various phenomena are studied across a wide range of languages ... field work is an important tool...

Dept of Linguistic and Cultural Evolution

Russell Gray, “evolutionist”



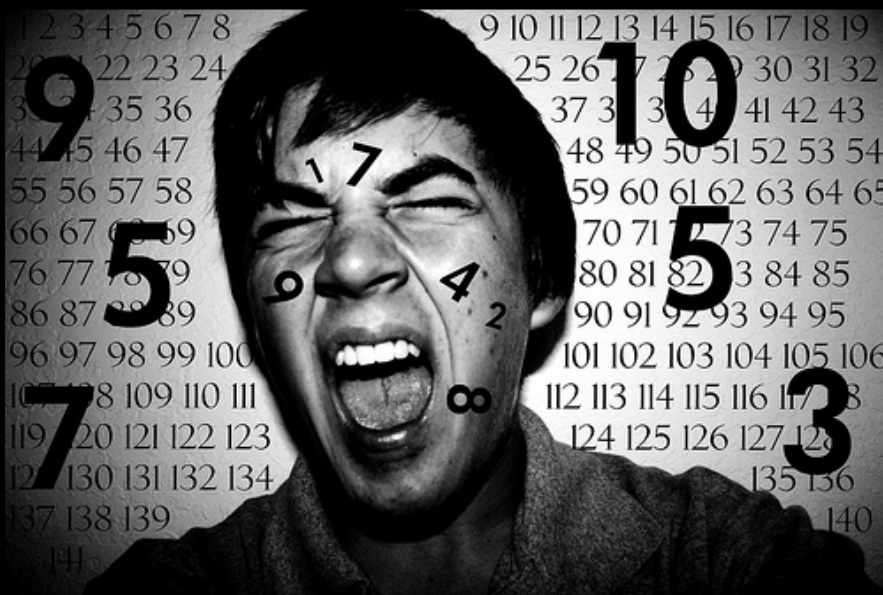
... bring together biologists, linguists and social scientists to apply cutting-edge ... computational advances from the natural sciences while still maintaining the highest standards of scholarship from the humanities ... [to resolve] long-standing questions about human history that were previously deemed difficult, or even completely intractable.

# ILL WIND — OR BREATH OF FRESH AIR?

- Linguistics being outdone — even led? — by other disciplines?
- Led ... by non-linguistic tools and models:
  - From biological or mathematical sciences.
  - Unsited to language?
- Led ... in which direction?
- Change of focus, even of whole objective?
  - Language for language's sake ...
    - Language for human (pre)history.



# BE NOT AFRAID!



## LINGUISTS, MEET NUMBERS ...

- Change in **methods**: numbers. But ...
  - You can't get good numbers without the qualitative analysis.
  - Typological and universal tendencies also need quantitative answers.



# HOW DID IT COME TO THIS?

Make the news.

Get the funding.

Call the shots.

- Old question  
— hot news.
- Linguistics began  
with a question  
posed in ... 1786.
- Still no answer!
- Huge new advances ...  
from *outside* linguistics.



The screenshot shows the BBC News homepage. The main headline is "DNA documents ancient mass migration" with a sub-headline "DNA analysis has revealed evidence for a massive migration into the heartland of Europe 4,500 years ago." Below the headline is a list of related topics: "Europeans drawn from three 'tribes'", "Looks of early European revealed", "European origins laid bare by DNA", and "Making of Europe unlocked by DNA". To the right, a "Most Popular" section lists several articles, with the top one being "DNA documents ancient mass migration".



LATEST NEWS



JUG WITH BROAD HANDLE AND INSICED DECORATION/WERNER FROM AN ARCHIVE/BRIDGEMAN IMAGES

The creators of the Corded Ware culture, named after this intricate pottery, may have spoken an Indo-European language derived from one spoken by herders from the East.

## Mysterious Indo-European homeland may have been in the steppes of Ukraine and Russia



By Michael Balter | 13 February 2015 2:15 pm | 77 Comments

What do you call a male sibling? If you speak English, he is your "brother." Greek? Call him "phrater." Sanskrit, Latin, Old Irish? "Bhrater," "frater," or "brathir," respectively. Ever since the mid-17th century, scholars have noted such similarities among the so-called Indo-European languages, which span the world and number more than 400 if dialects are included. Researchers agree that they can probably all be traced back to one ancestral language, called Proto-Indo-European (PIE). But for nearly 20 years, scholars have debated vehemently when and where PIE arose.

Two long-awaited studies, one described online this week in a preprint and another scheduled

NATURE | NEWS

## Steppe migration rekindles debate on language origin

Eurasian region gains ground as birthplace of Indo-European tongues.

Ewen Callaway

18 February 2015

### STEPPE IN TIME

An ancient-DNA study links the Corded Ware culture of northern Europe with the Yamnaya culture of the Eurasian steppe. It points to a mass migration northwest that would support the Steppe hypothesis, one of two theories that compete to explain the origins of the Indo-European family of languages.



## Massive migration from the steppe was **a** source for Indo-European languages **in Europe** *Some? All?*

Wolfgang Haak, Iosif Lazaridis, Nick Patterson, Nadin Rohland, Swapan Mallick, Bastien Llamas, Guido Brandt, Susanne Nordenfelt, Eadaoin Harney, Kristin Stewardson, Qiaomei Fu, Alissa Mittnik, Eszter Bánffy, Christos Economou, Michael Francken, Susanne Friederich, Rafael Garrido Pena, Fredrik Hallgren, Valery Khartanovich, Aleksandr Khokhlov, Michael Kunst, Pavel Kuznetsov, Harald Meller, Oleg Mochalov, Vayacheslav Moiseyev  
✚ *et al.*

*Nature* (2015) | doi:10.1038/nature14317

Received 29 December 2014 | Accepted 12 February 2015 | Published online 02 March 2015

Haak *et al.* (2015)

“a steppe origin of at least some of the Indo-European languages of Europe.”



# GENERATIVISM: RUNNING SCARED?

## A fictionalized but familiar conversation ...

"So can you name any real discovery made by generative syntax?"

*"How about hierarchical phrase structure, which obeys its own principles but interacts with just about everything else in language?"*

*"What about case theory and other deep principles that shape the phrases of languages"?*

*"Or uniform locality conditions that cut across distinct constructions?"*

*"The discovery in all these areas of a deep unity amidst the diversity of the syntax of the world's languages?"*

"Very interesting, but can you name any *real* discovery made by generative syntax?"

LSA, Boston, January 2013, plenary by David Pesetsky (MIT)

“Что дѣлать? What is to be done?”

# SCARED OF WHAT?

Evans & Levinson (2009)

*Behavioral and Brain Sciences*

Languages differ so fundamentally from one another at every level of description ... that it is very hard to find any single structural property they share. The claims of Universal Grammar ... are either empirically false, unfalsifiable, or misleading ...

Structural differences should instead be accepted for what they are, and integrated into a new approach to language and cognition that places diversity at centre stage ... Chomsky's notion of Universal Grammar (UG) has been mistaken ... for a set of substantial research findings about what all languages have in common.

BEHAVIORAL AND BRAIN SCIENCES (2009) 32, 429–492  
doi:10.1017/S0140525X0999094X

## The myth of language universals: Language diversity and its importance for cognitive science

**Nicholas Evans**

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Australian National University, ACT 0200, Australia*

[nicholas.evans@anu.edu.au](mailto:nicholas.evans@anu.edu.au)

[http://rspas.anu.edu.au/people/personal/evann\\_ling.php](http://rspas.anu.edu.au/people/personal/evann_ling.php)

**Stephen C. Levinson**

*Max Planck Institute for Psycholinguistics, Wundtlaan 1, NL-6525 XD  
Nijmegen, The Netherlands; and Radboud University, Department of  
Linguistics, Nijmegen, The Netherlands*

[stephen.levinson@mpi.nl](mailto:stephen.levinson@mpi.nl)

<http://www.mpi.nl/Members/StephenLevinson>

Dunn *et al.* (2011)

## LETTER

doi:10.1038/nature09923

### Evolved structure of language shows lineage-specific trends in word-order universals

Michael Dunn<sup>1,2</sup>, Simon J. Greenhill<sup>1,4</sup>, Stephen C. Levinson<sup>1,2</sup> & Russell D. Gray<sup>3</sup>

Languages vary widely but not without limit. The central goal of linguistics is to describe the diversity of human languages and explain the constraints on that diversity. Generative linguists following Chomsky have claimed that linguistic diversity must be constrained by innate parameters that are set as a child learns a language ... after the noun, whereas positions, relative clause explanation for these obent ('harmonic') in their of a phrase relative to its



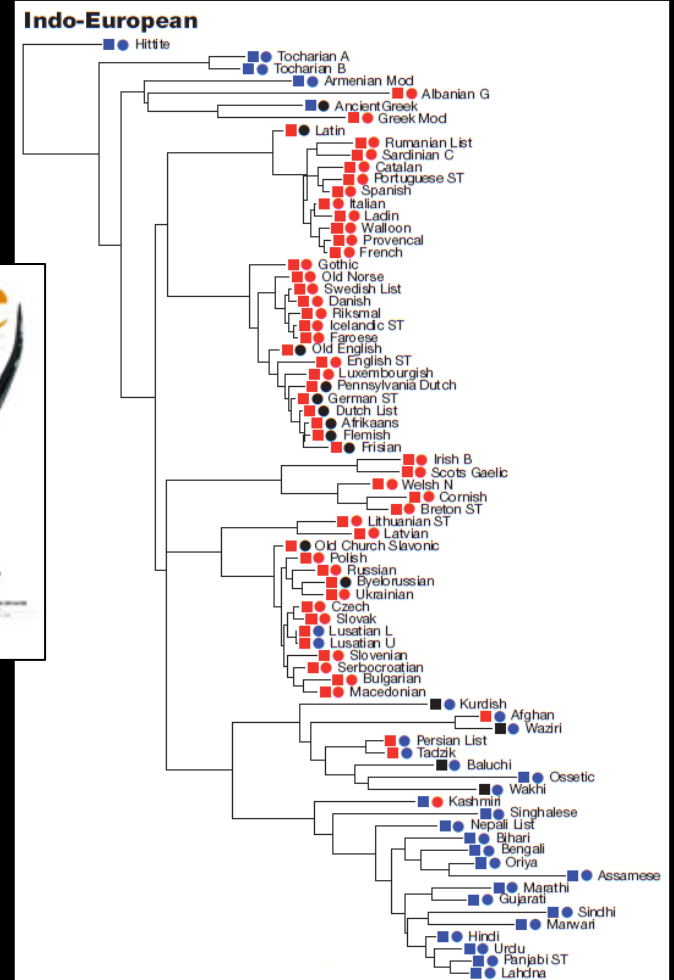
Generative linguists

following Chomsky have claimed that linguistic diversity must be constrained by innate parameters that are set as a child

learns a language ... [Our] findings ... that

— at least with respect to word order —

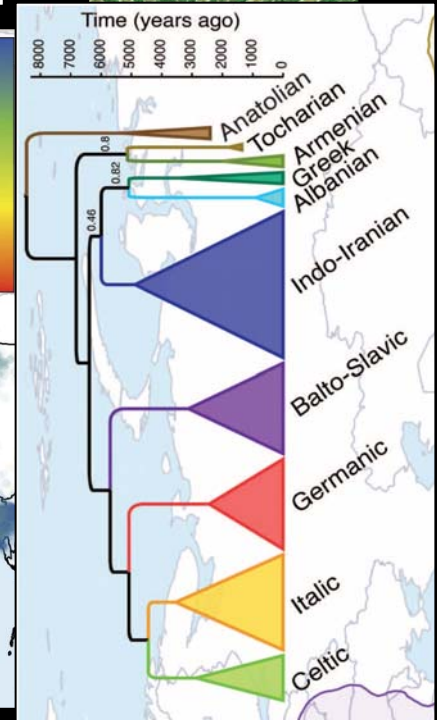
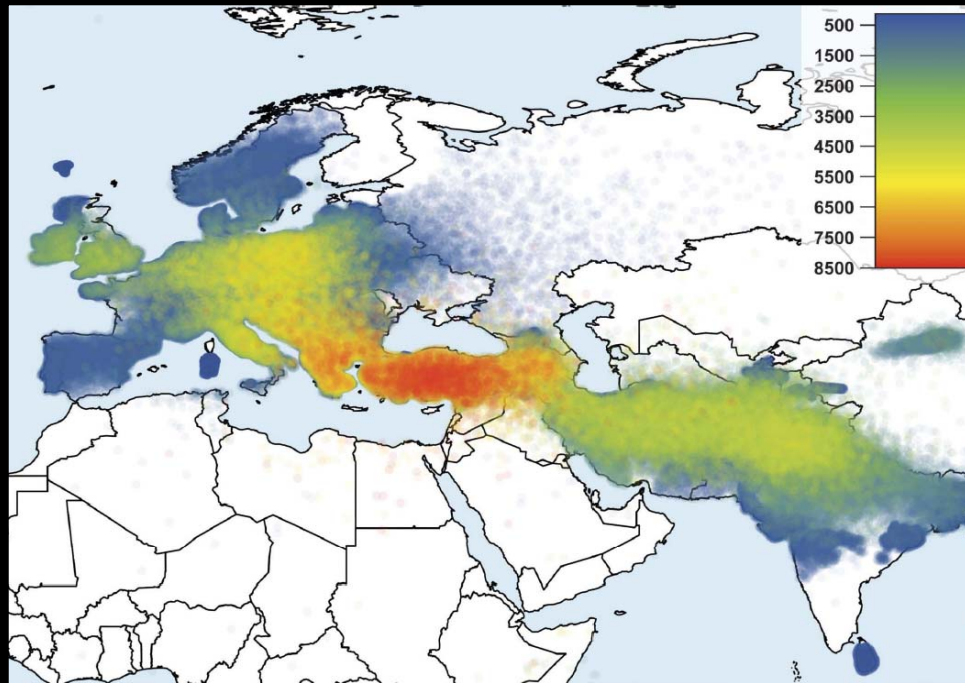
cultural evolution is the primary factor that determines linguistic structure....



Bouckaert *et al.* (2012)

# Mapping the Origins and Expansion of the Indo-European Language Family

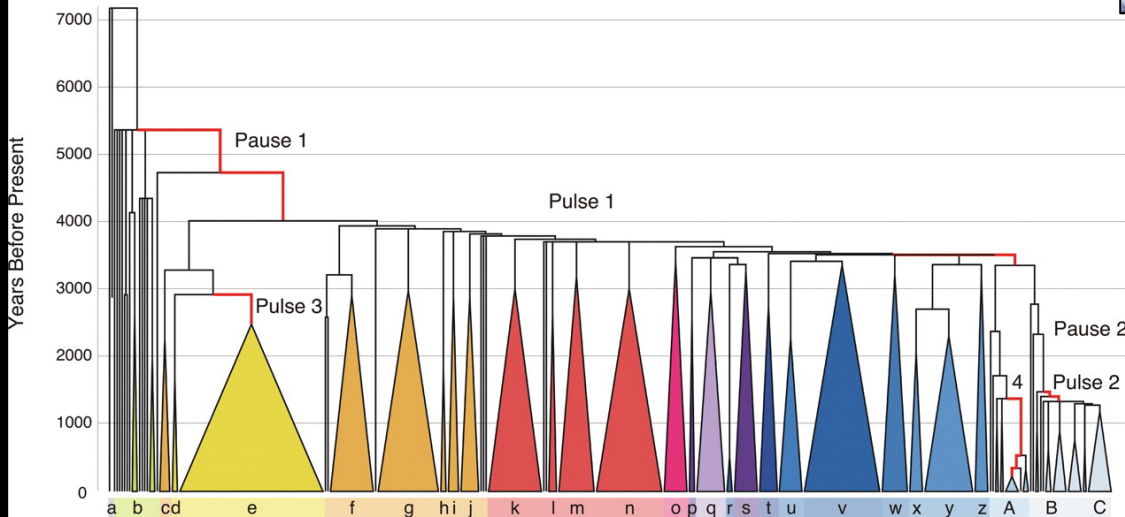
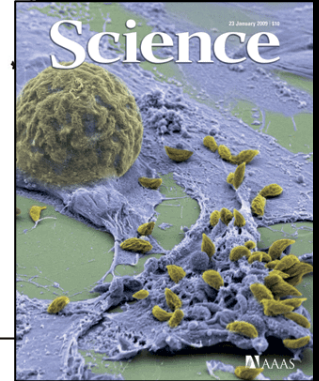
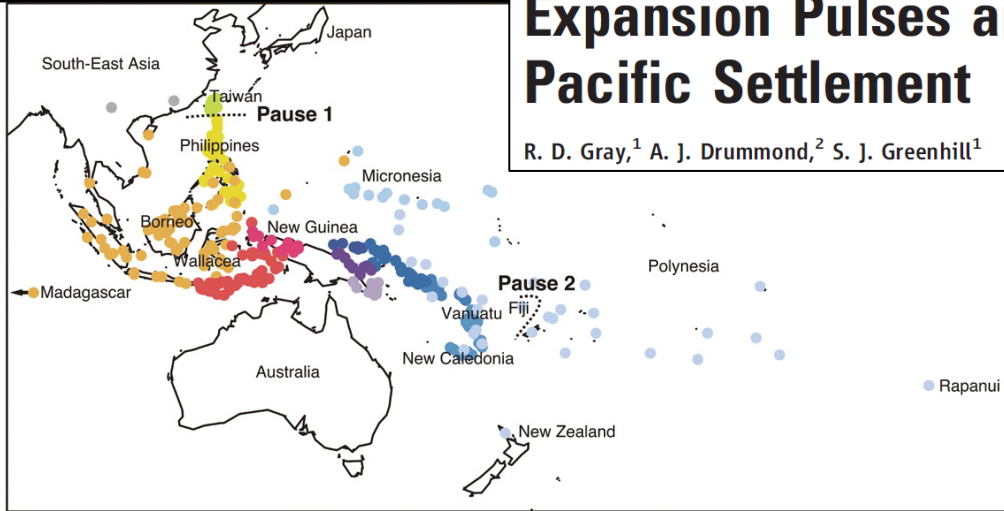
Remco Bouckaert,<sup>1</sup> Philippe Lemey,<sup>2</sup> Michael Dunn,<sup>3,4</sup> Simon J. Greenhill,<sup>5,6</sup>  
Alexander V. Alekseyenko,<sup>7</sup> Alexei J. Drummond,<sup>1,8</sup> Russell D. Gray,<sup>5,9</sup>  
Marc A. Suchard,<sup>10,11,12</sup> Quentin D. Atkinson<sup>5,13\*</sup>



Gray *et al.* (2009)

# Language Phylogenies Reveal Expansion Pulses and Pauses in Pacific Settlement

R. D. Gray,<sup>1</sup> A. J. Drummond,<sup>2</sup> S. J. Greenhill<sup>1</sup>

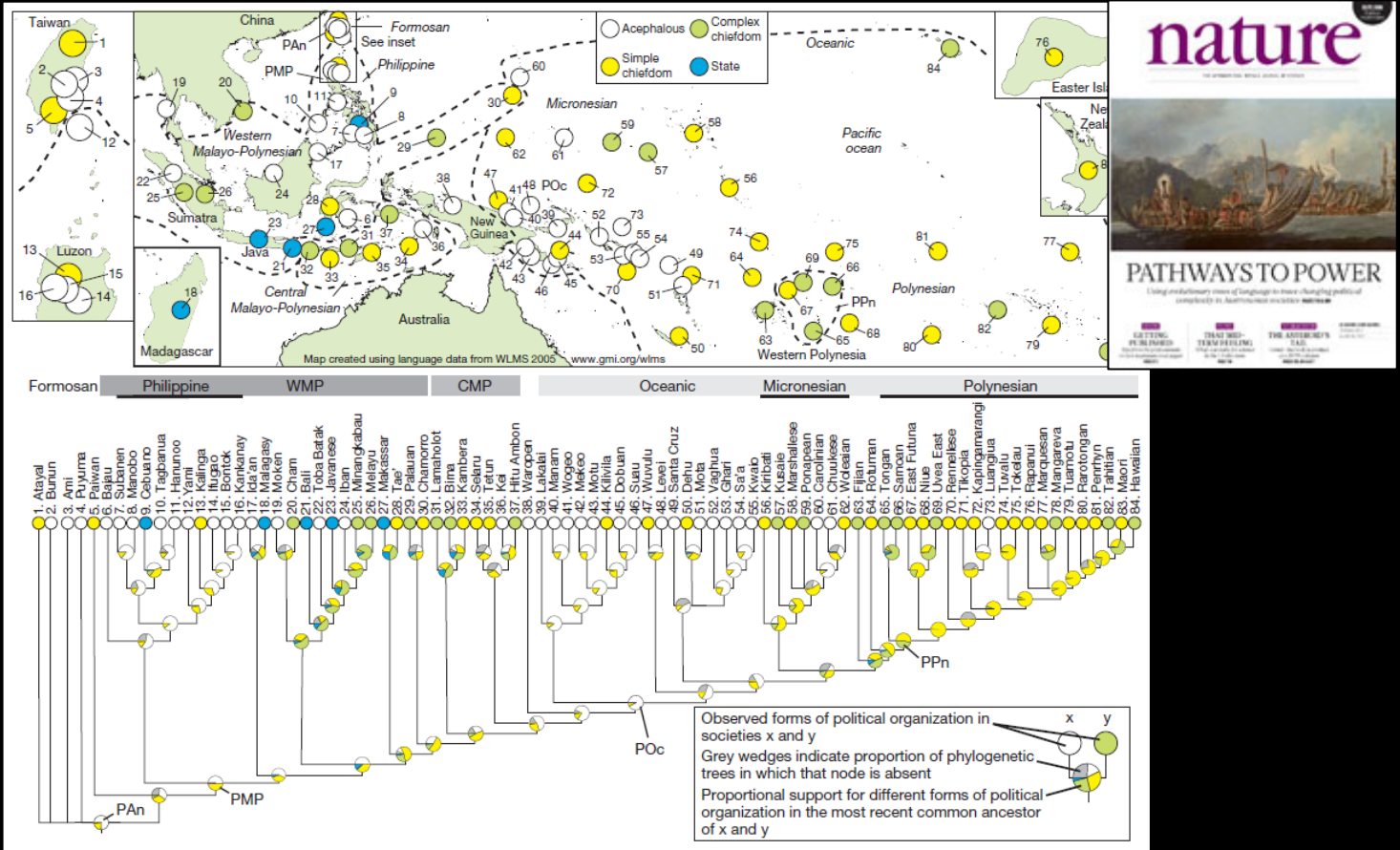




Currie *et al.* (2010)

# Rise and fall of political complexity in island South-East Asia and the Pacific

Thomas E. Currie<sup>1,2</sup>, Simon J. Greenhill<sup>3,4</sup>, Russell D. Gray<sup>1</sup>, Toshikazu Hasegawa<sup>1</sup> & Ruth Mace<sup>2</sup>



Linguistics as a reference framework for human cultural (pre)history?

# Forster & Renfrew (2011), *Science* — geneticist & archaeologist

EVOLUTION

## Mother Tongue and Y Chromosomes

Peter Forster<sup>1,2</sup> and Colin Renfrew<sup>3</sup>

A global picture is emerging of sex-specific transmission of language change in quite different regions and continents.



**Language transmission.** Glossogenetic studies relate Y-chromosome DNA types with language in the indicated regions. Such correlation is not observed for mtDNA, which is inherited from the mother. "Melanesian" designates non-Malayo-Polynesian languages in New Guinea, where Malayo-Polynesian is spoken in coastal pockets. The hatched region shows Bantu as a branch within the Niger-Congo language family.

Male vs. female lines match differently with language lineages.

# IF YOU CAN'T BEAT 'EM, JOIN 'EM?

## LanGeLin (LANguage -GEnE LINeages)



Meeting Darwin's Last Challenge:  
Toward a Global Tree of Human Languages and Genes

“gene-language congruence ... by formal syntax ... brought to bear on historical issues.”

UNIVERSITY of York

Department of Language and Linguistic Science

Current partners beyond York are:

- ▶ [University of Campinas](#) (Brazil)
- ▶ [University of Pennsylvania](#) (USA)



### Centre for Linguistic History and Diversity

- ▶ [Workshop on Language Variation and Change and Cultural Evolution](#)
- ▶ [The New Historical Linguistics and the World of Annotated Corpora](#)

# FROM LANGUAGES TO HISTORY ... BY NUMBERS?

## 1

### Encode

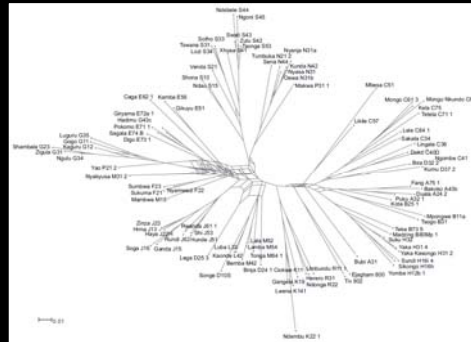
turn language data  
into numbers



## 2

### Number Crunch

statistical & phylogenetic  
analysis & visualisation



## 3

### Interpret

what the results mean  
for (pre)history



- At each stage:
  - Concerns, problems, dangers, false analogies.
  - Opportunities, scope for huge advances.

# STAGE 1:



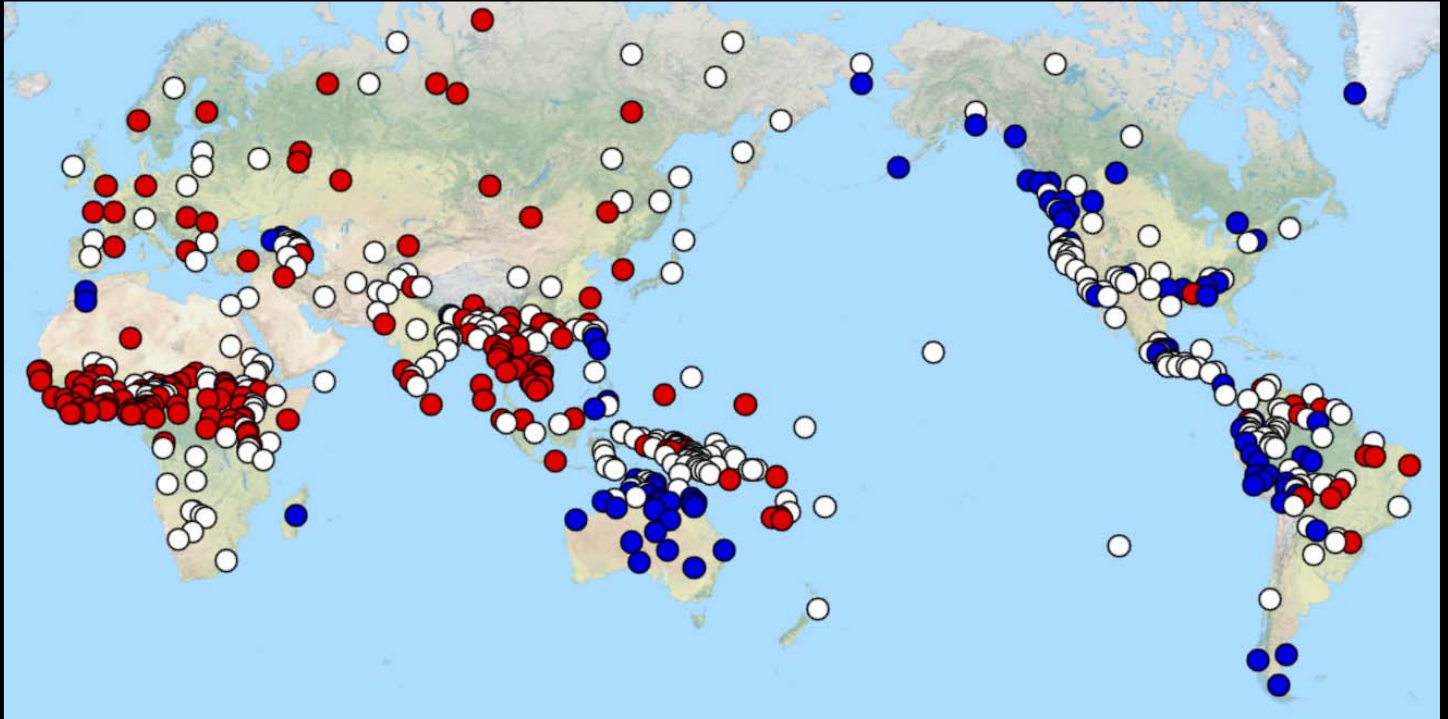
THINK OF A  
NUMBER,  
**ANY** NUMBER

QUANTITY VS. QUALITY?



# PUTTING MEANINGFUL NUMBERS ON LANGUAGE?

World Atlas of Language Structures — WALS — <http://wals.info>




Maddieson (2013: WALS 2a): Vowel Quality Inventories

# QUANTIFICATION, RULE 1: DO NOT 'BIN' CONTINUOUS DATA

“the WALS data are binned into ranges ...”

(Atkinson 2011: SI 2)

## Values

	Small (2-4)	93
	Average (5-6)	287
	Large (7-14)	184

- Vowel:            small [2-4]                            medium [5-6]                            large [7-14]

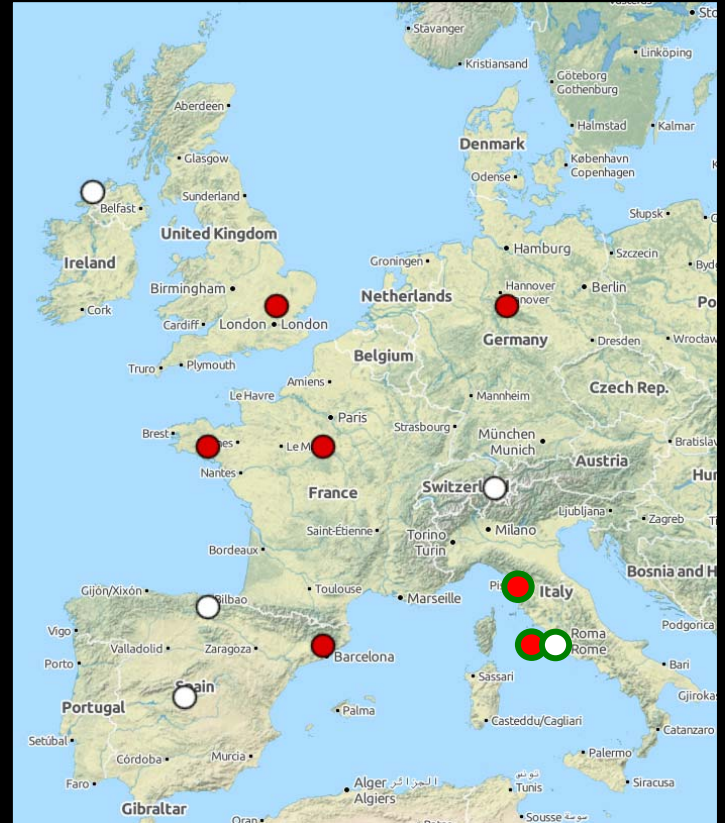
When vowel qualities are counted in this way in the sample of languages surveyed for this chapter, the average number of vowels in a language is just fractionally below **6**. The smallest vowel quality inventory recorded is 2 and the largest 14.

Maddieson (2013: WALS 2a)

- Consonant:    small [6-14]                            mod. small [15-18]                            average [19-25]  
                  mod. large [26-33]                            large [34+]
- Tone:            no tone                            simple tone                            complex tone ...

# WHEN 7 = 13 ... BUT NOT 5

- English: 13 = ●
  - German: 14 = ●
  - Spanish: 5 = ○
  - Latin: 5 = ○  
(5 long + 5 short)
  - Italian: 7 = ●  
= 5 basic, + /ε/ /ɔ/ if stressed
- ● = ● i.e. 7 = 13 = 14
  - ● ≠ ○ i.e. 7 ≠ 5

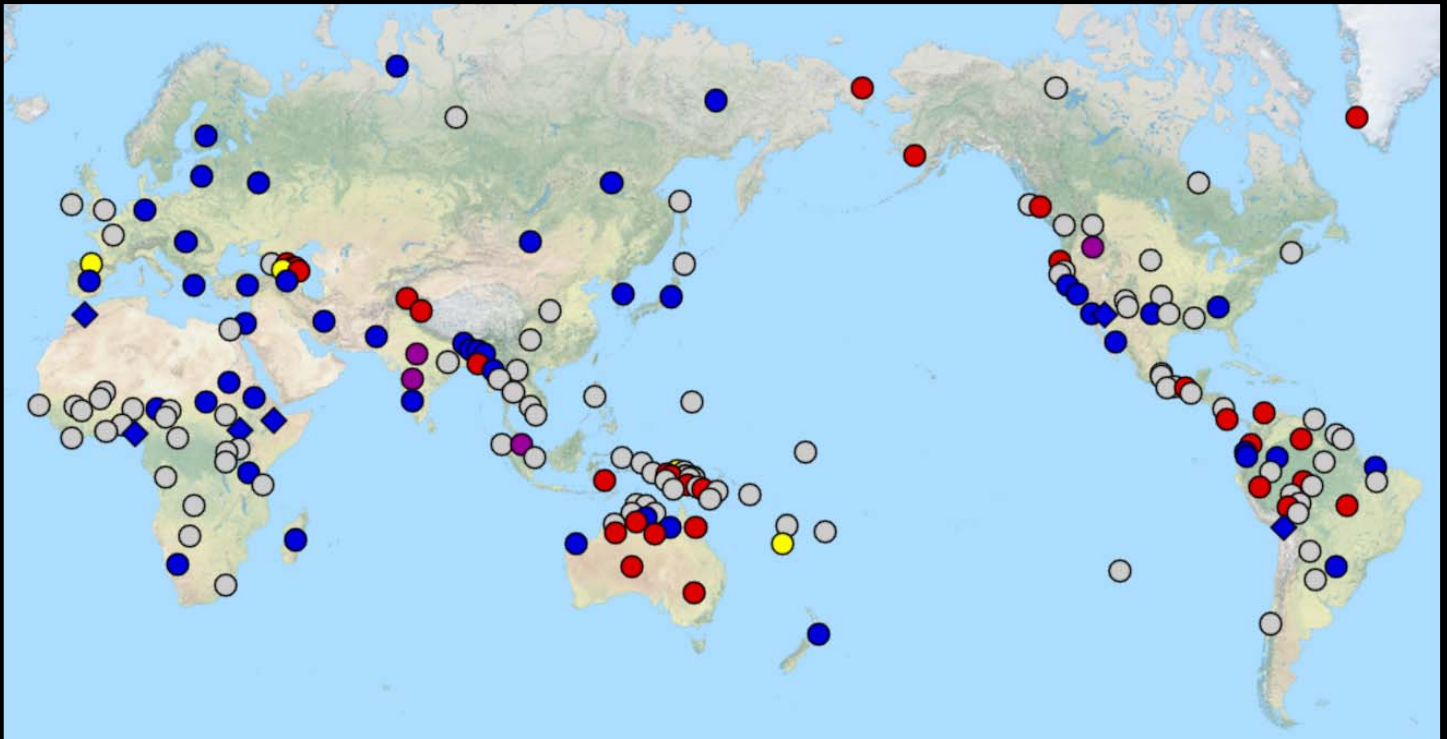


→ In vowel quality inventory, Italian is represented as ...

- Identical to English, German = most extreme languages in sample.
- Completely different to Spanish, Latin = just on other side of mean (6).

# QUALITATIVE OR QUANTITATIVE?

World Atlas of Language Structures — WALS — <http://wals.info>



Comrie (2013: WALS 98a): Alignment of Case Marking of Full Noun Phrases

# PUTTING MEANINGFUL ‘NUMBERS’ ON LANGUAGE

But the main recurrent difficulty is that in many languages, different kinds of full noun phrases partake of different case marking patterns. For instance, in **Spanish** the accusative marker, the preposition *a*, is found (roughly) only with specific, animate noun phrases, so that strictly speaking a noun phrase like the male proper name *Juan* has a nominative–accusative case marking system, while the inanimate noun phrase *el libro* ‘the book’ has a neutral case marking system, as illustrated partially in (7).

## (7) Spanish

a. *María vio a Juan.*

Mary see.AOR.3SG ACC John

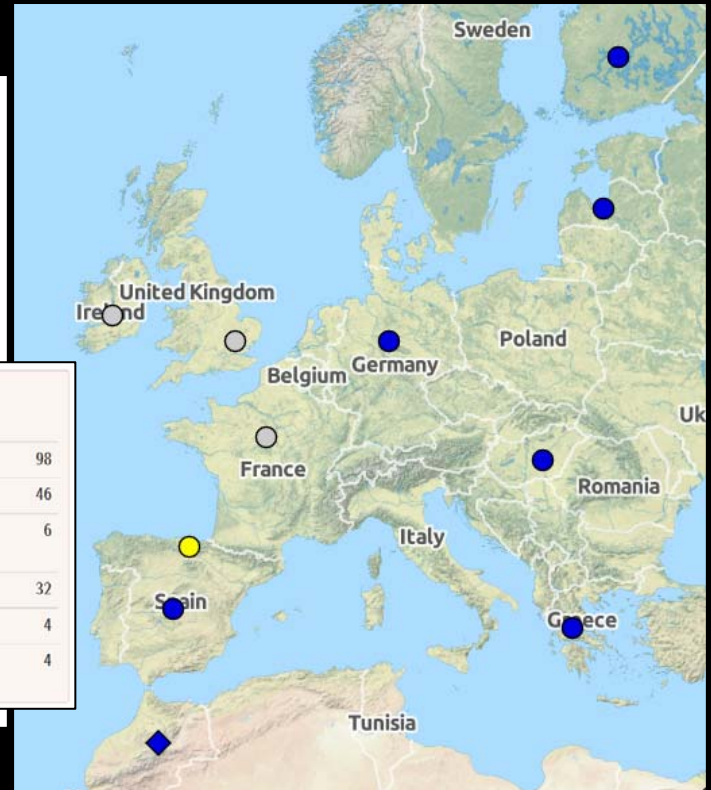
‘Mary saw John.’

b. *María vio el libro.*

Mary see.AOR.3SG the book

‘Mary saw the book.’

Values	
○ Neutral	98
● Nominative - accusative (standard)	46
◆ Nominative - accusative (marked nominative)	6
● Ergative - absolutive	32
● Tripartite	4
● Active-inactive	4



‘Qualitative’ justification (‘personal a’)...



... but 'anti-quantitative':

A. The policy that has been followed in assigning such languages to types has been to maximize the occurrence of overt case marking. Thus, if a language has an optional accusative case marker, or one that occurs only under certain specified circumstances, then this has been given priority and taken as critical. This policy decision needs to be taken into account consistently in interpreting the maps ... Thus, Spanish and Burmese come out as accusative, Araona and Gooniyandi as ergative, and Hindi as tripartite.

• "Maximise ... priority ... critical" →

– All = ●. Any = ●. Any = all.

– 0.01 is closer to 1 than to 0.

0.01 is 1.

1% = 100%.

## QUALITATIVE OR QUANTITATIVE?

- An atlas for display purposes (APiCS too) ...
- ... but being used as a database for quantitative purposes.
- Other issues:
  - (Mis)used for inferences about **genealogy** ...  
... but WALS ‘families’ very controversial:  
*e.g.* \*Khoisan, \*Altaic, \*Australian, \*Nilo-Saharan, etc...
  - Coverage of languages sparse (avg. under 3%) and inconsistent.
- We need new databases dedicated for **quantitative** uses.
- Qualitative *or* quantitative?      “It doesn't have to be this way ...”

# NEW DATABASES: QUALITATIVE AND QUANTITATIVE

GLOTTOBANK: world-scale databases, specifically for quantitative applications...

- GRAMBANK Harald Hammarström, Hedvig Skirgård
- LEXIBANK Simon Greenhill
- PHONOBANK Mattis List
- IELEX and URALEX Michael Dunn
- Syncretism in paradigms Nick Evans



# STAGE 2: CRUNCHING THE NUMBERS

TOOLS & MODELS

STATISTICS & PHYLOGENETICS

# CLIMBING DOWN FROM THE TREES?

- Being led by the tools and models?
- Tree idealisation: a concern with new phylogenetic models?
- Far more of a problem for *traditional* historical linguistics...  
*e.g.* Best-researched 'LOL' families in world: agreed trees?

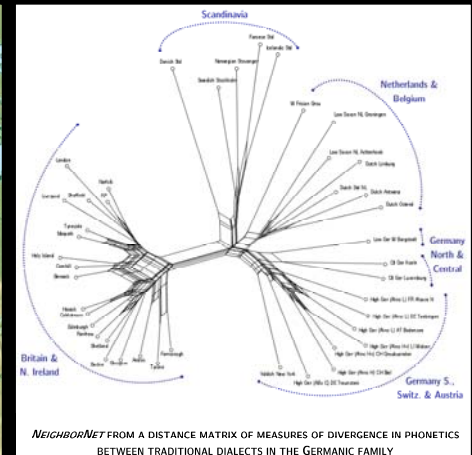
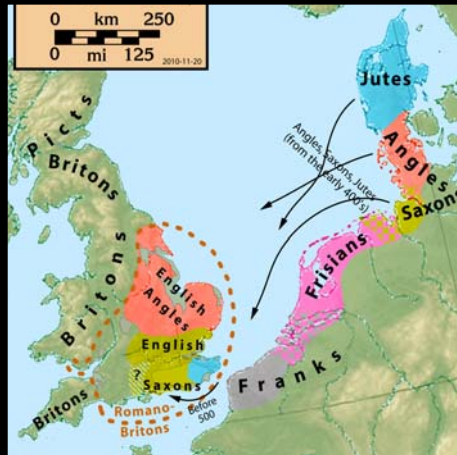
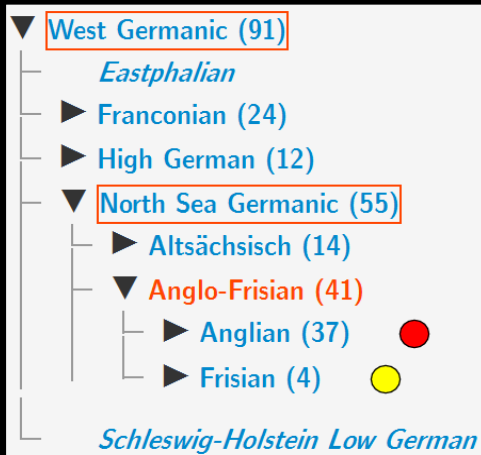


- Wild goose chase: no tree reflects historical realities of speaker populations.



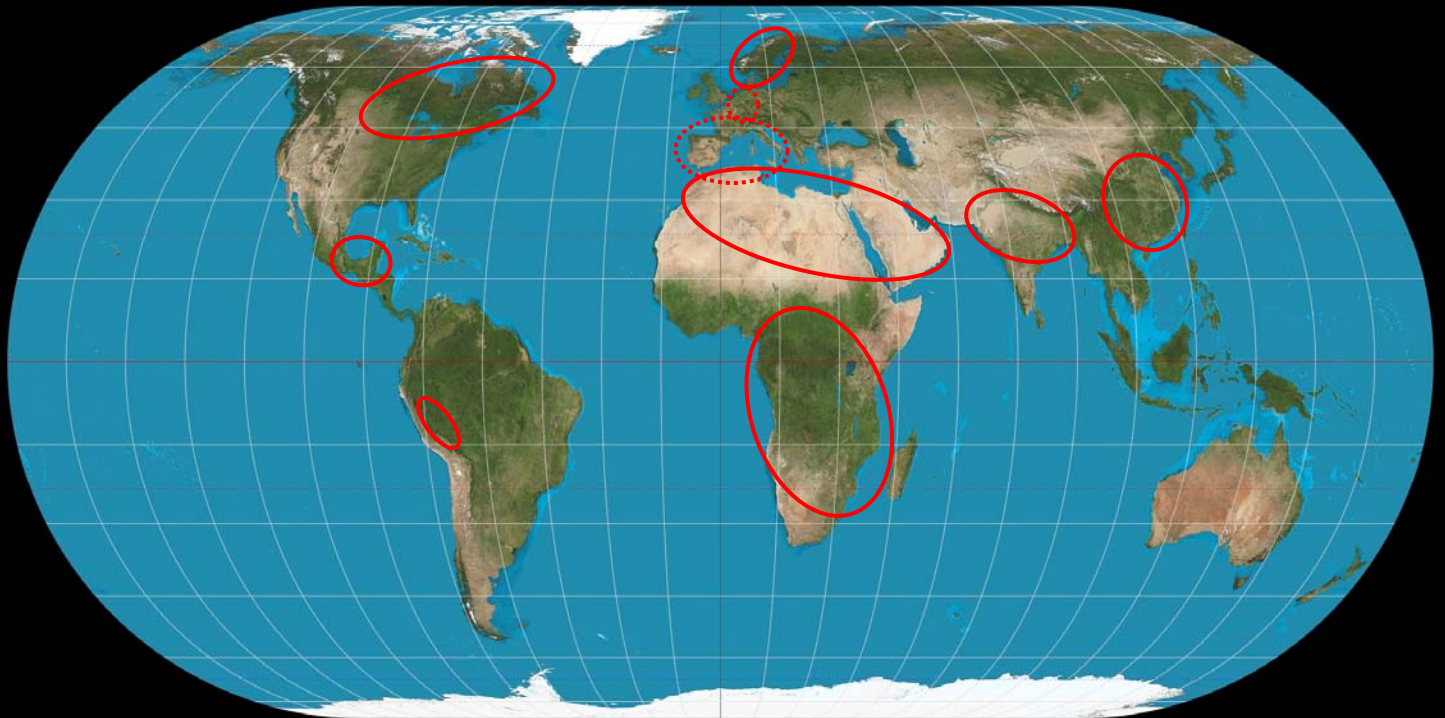
# THE TREE MODEL VS. REAL POPULATION HISTORY ...

- Human societies do **not** live ('evolve') *only* in binary branching relationships.
- So nor do their languages. (Cause-and-effect relationship.)



- Alex François (Société Linguistique de Paris, 17<sup>th</sup> January 2015).
  - Exploding a myth: Comparative Method  $\neq$  Trees!
  - It's precisely the comparative method that confirms data not tree-like!

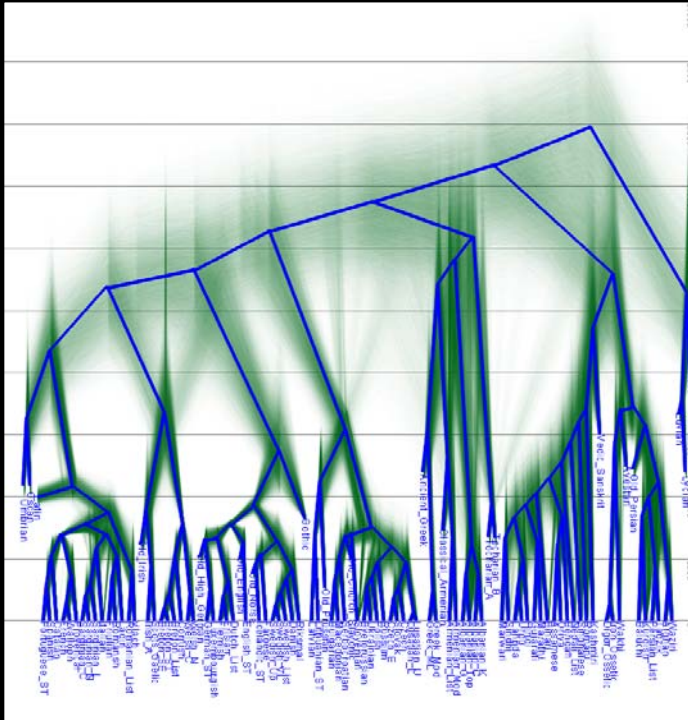
# HISTORIES NOT TREE-LIKE: A NEGLIGIBLE FRUSTRATION?



Indic, Arabic, 'Chinese', Bantu, Mayan, Quechua, Algonquian,  
Italy, Scandinavia, Switzerland — formerly much more of Europe ...

# BAYESIANISM: HANDLING AND MEASURING UNCERTAINTY

Bouckaert (2015, last Friday)



'Distribution' of Indo-European phylogenies

Ringe *et al.* (2002)

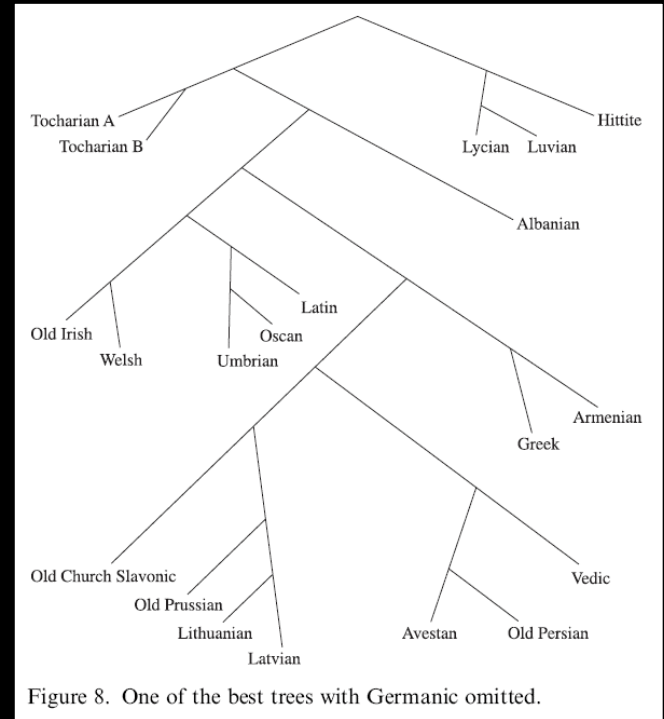


Figure 8. One of the best trees with Germanic omitted.

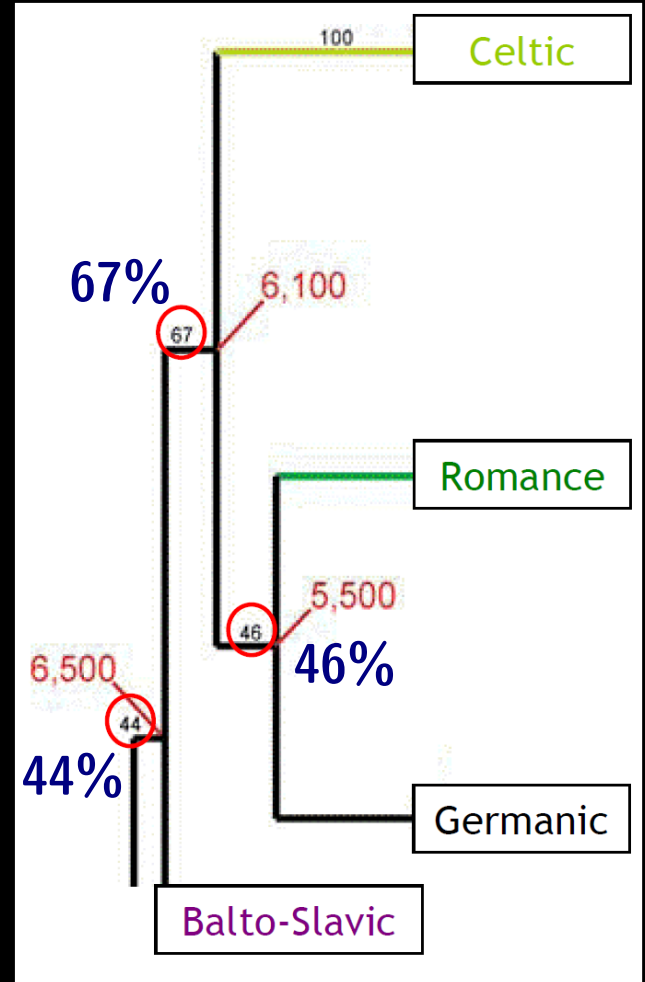
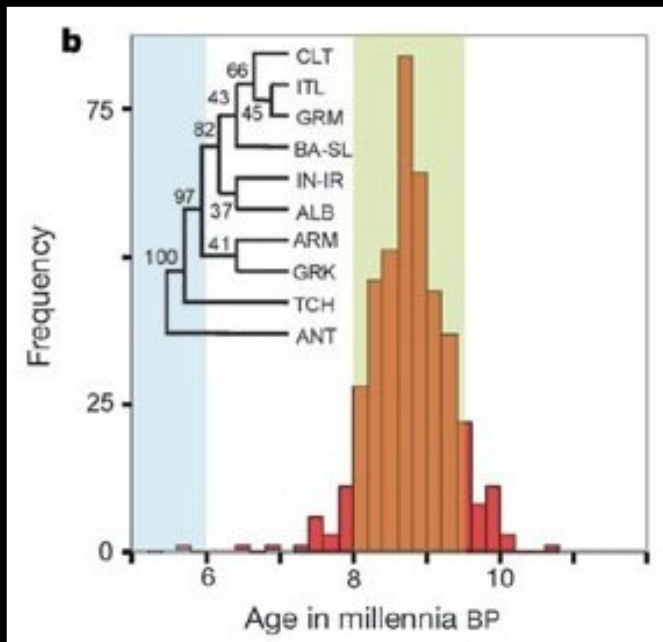
single 'perfect phylogeny' (no Germanic!)

Which is more realistic?

Gray & Atkinson (2003)

**letters to nature**

**Language-tree divergence times support the Anatolian theory of Indo-European origin**



- Time range of farming not Steppe hypothesis.

# STAGE 3: INTERPRETATION

FROM DATA ANALYSES  
TO HUMAN (PRE)HISTORY



# INTERPRETATION THROUGH VISUALISATION TOOLS

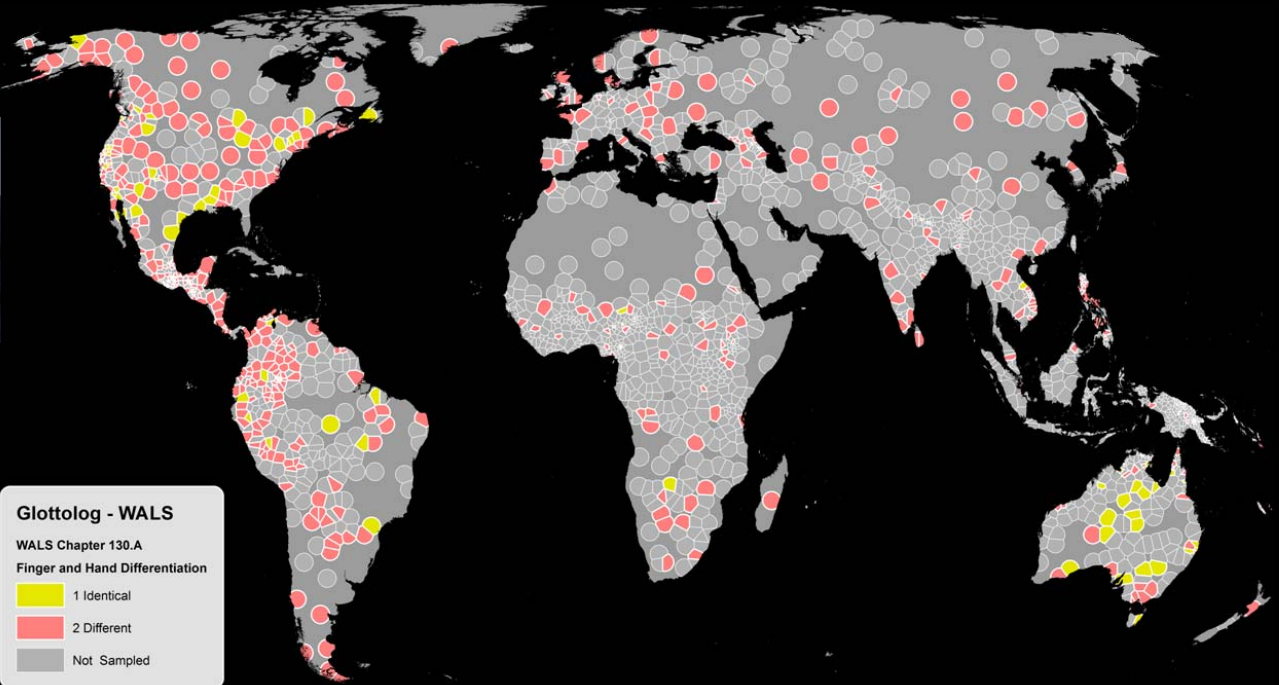
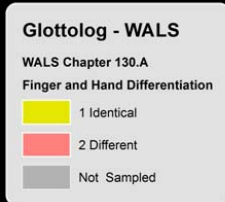


Brown, C.H. 2013. Finger and hand.

in M. S. Dryer & M. Haspelmath (eds) *The World Atlas of Language Structures Online*,  
Leipzig: Max Planck Institute for Evolutionary Anthropology. <http://wals.info/chapter/130>

- Languages with no data not shown.
- Mercator = area distorting projection, which ...

... “SHOULD NEVER BE USED FOR DENSITY VISUALISATION PURPOSES”



Moran, S. & McNew, G. (2015) Visualizing WALS data.

Workshop on *Language Comparison with Linguistic Databases*, MPI-EVA, Leipzig, 2015 04 30.

- Eckert IV equal area projection, buffered Thiessen Tessellation.
- Languages with no data all included and shown as such.

# INTERPRETING STATISTICS: ANYONE FOR FISHING?

Everett (2013): *Evidence for direct geographic influences on linguistic sounds: the case of ejectives*



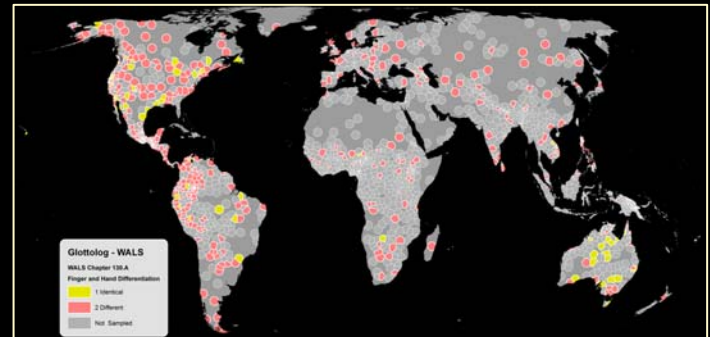
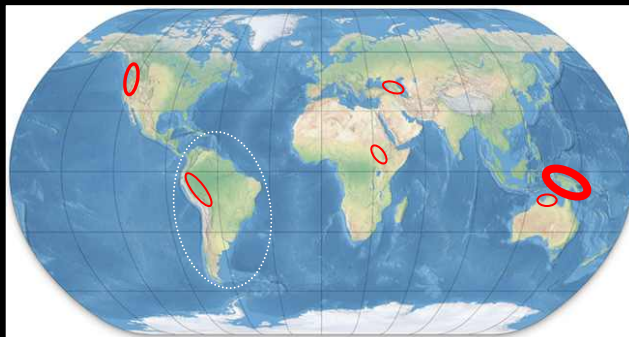
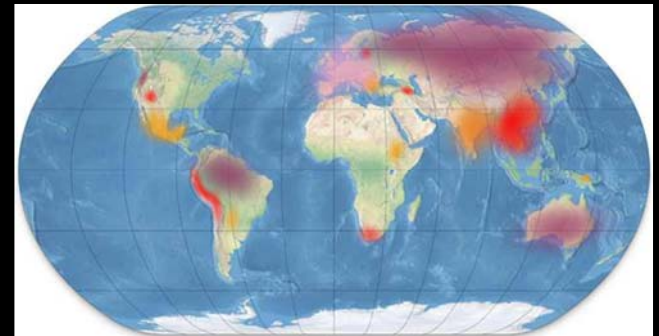
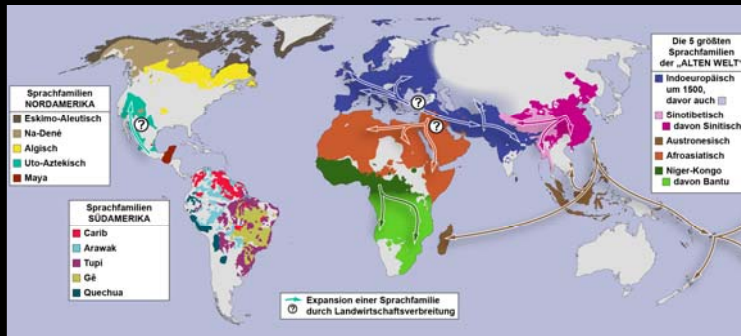
“62% of languages with ejectives are located in high elevation ‘zones’, which are defined here as major regions greater than 1500 m in altitude, plus land within 200 km of such a region”

Chen (2013): *The effect of language on economic behavior: evidence from savings rates, health behaviors, and retirement assets.*

“Lies, damned lies, and statistics.”

# PATTERNS IN LANGUAGE DIVERSITY: NOT JUST FAMILIES ...

Traditional 'family preference', especially for work on prehistory, but ...



.... linguistics has far more to say on human origins and interactions.

Patterns on all other 'diversity dimensions' of linguistic panorama.

# DADDY, WHERE DO LINGUISTIC AREAS COME FROM?

General principle: linguistic effects ← real-world causes.

## LANGUAGE FAMILIES

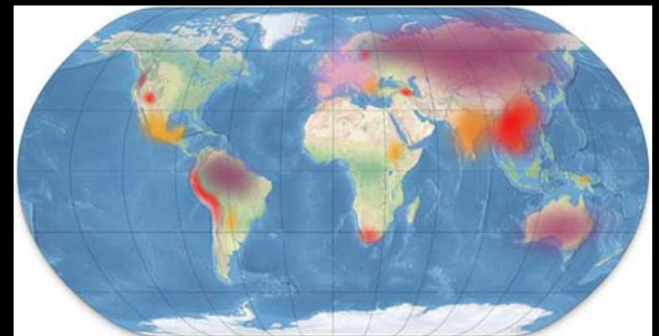
← expansive, divergent processes



Clear-cut: Member of family, yes or no?

## LINGUISTIC AREAS

← convergent processes.



Diffuse: core vs. peripheral members.



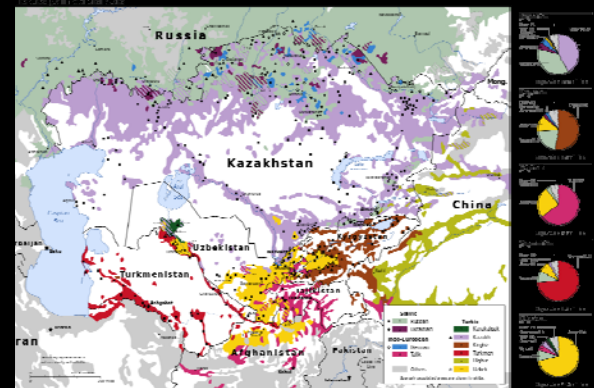
# PATTERNS AND CAUSATION: THE CASE OF “ALTAIC”



- CORE VS. PERIPHERY  
Altai vs. Uralic, Korean, Japanese  
= Pattern typical of convergence areas.

- ‘Mobility’, nomadism, very low density ...  
→ Family ‘spread zone’ (→ divergence)?

Or → Intense long-range contact → convergence (Steppe ‘confederations’).

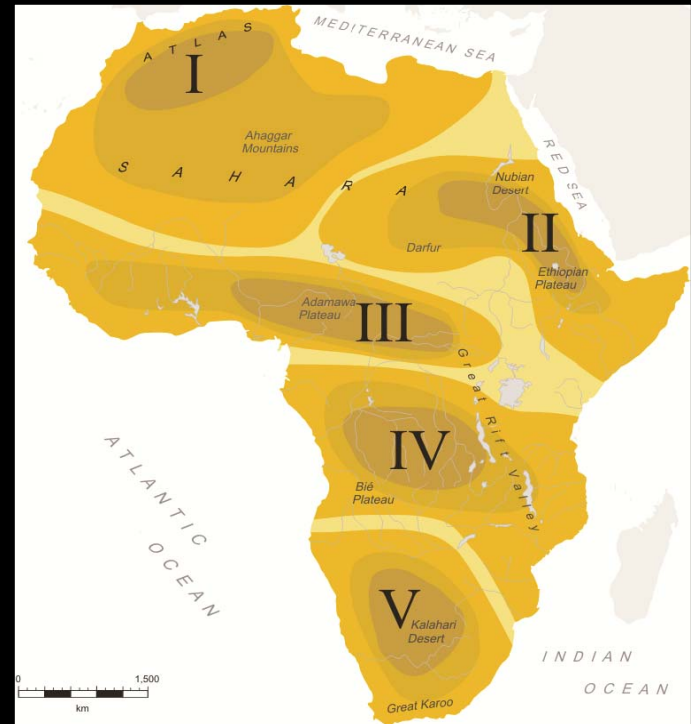
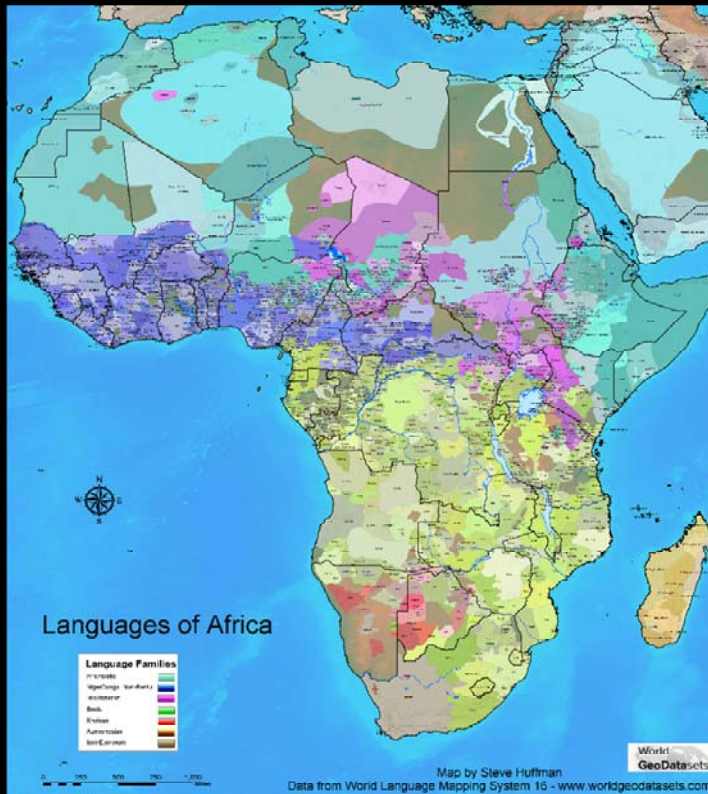


☒ A diverging ‘Altaic’ family.

☒ A North Eurasian convergence area.

# PATTERNS ON DIFFERENT DIMENSIONS: OVERLAPS & CONTRASTS

## DIVERGENT LANGUAGE FAMILIES — LINGUISTIC CONVERGENCE AREAS



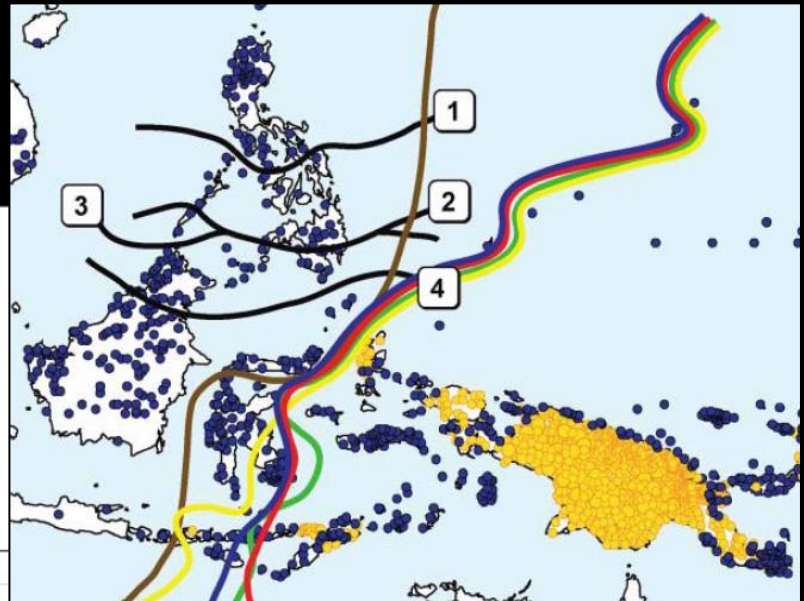
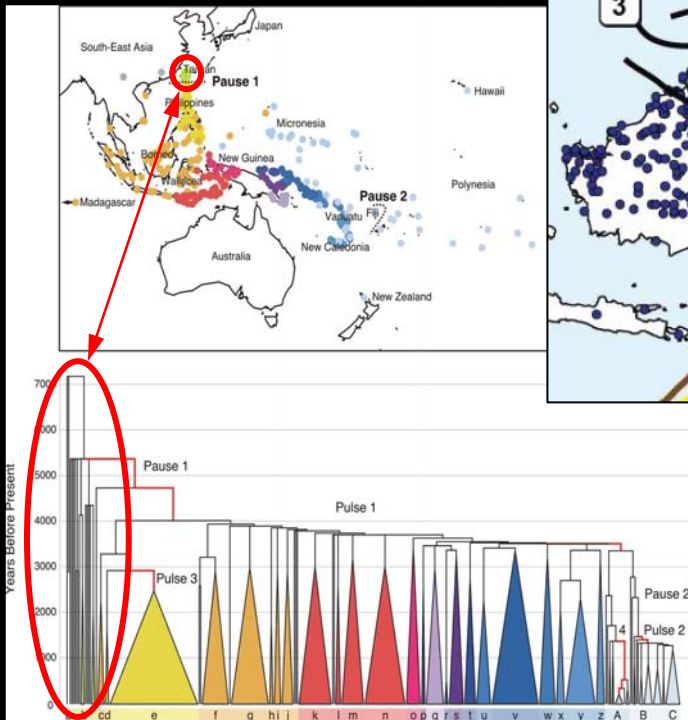
↑ Güldemann (2010):

*“Sprachraum” and geography: linguistic macro-areas in Africa*

# LANGUAGE STRUCTURES AND THE HOLY GRAIL

- 'Ultra-stable' structures / parameters → reveal deepest families, prehistory?

↓ Phylogeny of Austronesian  
Gray *et al.* (2009) ↓



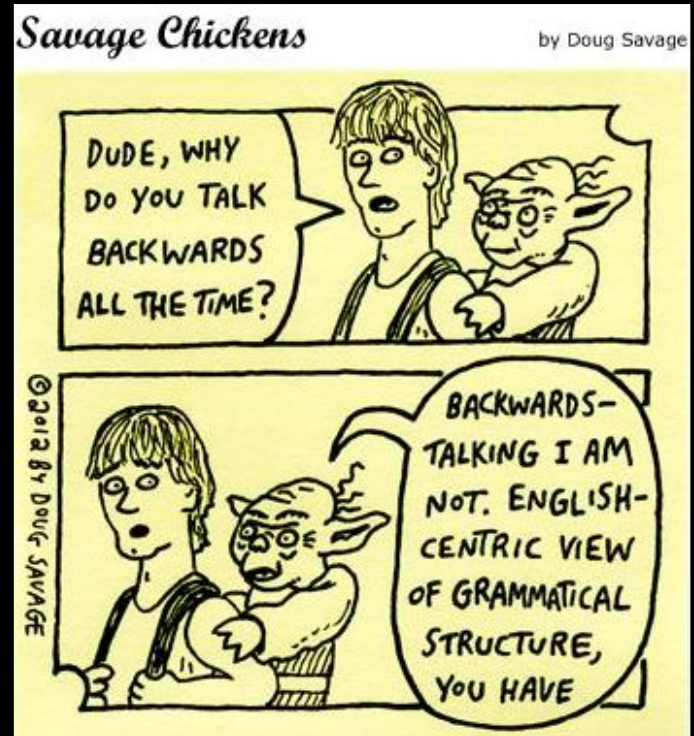
↑ Structural isoglosses  
within Austronesian  
Donohue & Denham (2010)

# WHEN STRUCTURES ARE MORE STABLE THAN *FAMILIES*.

## MASS LANGUAGE SHIFT

The same deep structural features:

- Resistant to internal change:
  - = Genealogically **most stable**.
  - *So long as transmission is normal ...*
- Resistant even through language shift:
  - Carried over into new language:
    - = Genealogically least stable.
    - = 'Stable' in speaker population, even when they switch genealogy.
- Features so stable structurally that they are .... unstable 'genealogically'...
  - Less diagnostic of deep genealogy than 'Austronesian' lexis!





# WELCOME TO THE 'NEW LINGUISTICS'

1. New databases ('GlottoBank'):
  - World-scale, fullest coverage.
  - Specifically for quantitative uses.
2. New 'number-crunching' models and analyses:
  - Constantly refined to get closer to modelling how *languages* behave.
3. New cross-disciplinary scope and co-operation:
  - Ancient DNA, archaeological science...





Some papers on some of these themes:

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